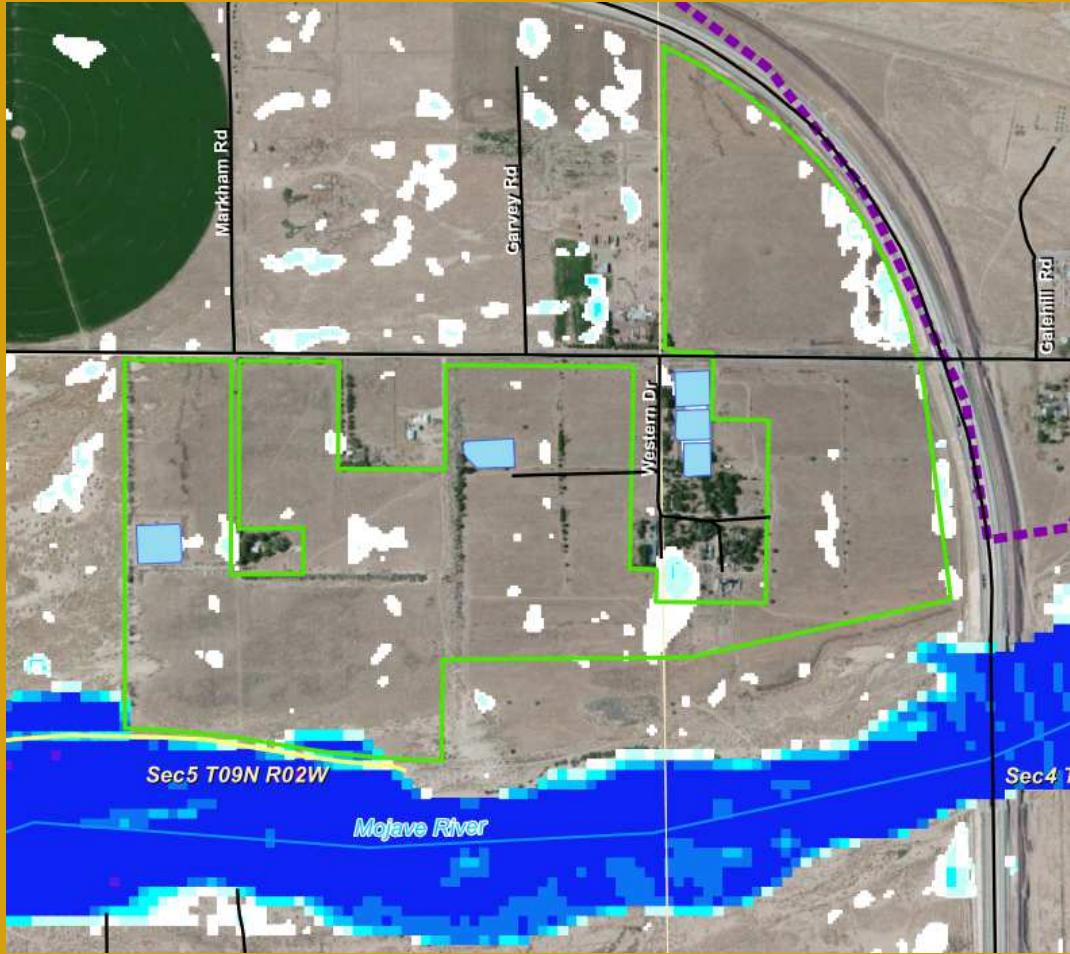


## PRELIMINARY HYDROLOGY STUDY

# Longboat Solar Project

San Bernardino County, California  
August 2014



#### Prepared For:

EDF Renewable Development, Inc.  
PO Box 504080  
San Diego, CA 95150



#### Prepared By:

Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344



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Project No. 0004258.00

## OVERVIEW

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The purpose of this preliminary hydrology report is to describe the hydrology of the proposed Longboat Solar Project (“the project”) and provide design information for use in the preliminary engineering design. This report is not intended to be submitted to the county for project approval. The project encompasses approximately 240 acres of land west of the City of Barstow in San Bernardino County, California. (Exhibit 1) At the time of this report, a site plan had not been finalized but it is anticipated that the project will consist of solar panels, a substation, operation and maintenance facilities and associated access roads. FLO-2D hydrologic/hydraulic modeling software was used to model the site hydrology.

## DATA SOURCES

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The models and methods used for this project utilize a combination of public and private data as shown in Table 1.

Table 1. Data Sources

Data Type	Format	Source	Use
San Bernardino County Hydrology Manual	PDF	San Bernardino County	Hydrology Guidance
Elevation	Digital Terrain Model (DTM)	Intermap	Model Elevations
Soils	Shapefile	USDA NRCS Web Soil Survey per San Bernardino County Hydrology Manual Addendum 2010	Curve Numbers
Landcover	Shapefile	2012 Crop Data Layer (CDL) modified based on aerial photography and to match San Bernardino County Hydrology Manual classifications	Curve Numbers
Precipitation	Text File	NOAA Atlas 14 Website	Design storms
HUC-12 Drainage Boundary	Shapefile	USGS	Define Model Extents
Site Boundary	CAD	EDF	Define Model Extents
2012 Aerial Photography	JPEG2000 Raster	ESRI WorldImage	Reference

## HYDROLOGY

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The project area is located west of the City of Barstow within the Mojave Desert. (Exhibit 2) The site generally flows from west to east and is located on the north bank of the Mojave River. The Mojave River adjacent to the project site has had a detailed FEMA study prepared which provides a peak flow in the river just upstream of the project. The project site is classified as Zone X (beyond the 100 year flood area). The offsite watershed is minor for the western half of the project site. Based on Intermap topography, there is an approximately 3.5 square mile drainage area which flows north to south though the eastern half of the site. The primary hydrologic issues in this landscape are flooding and erosive velocities.

FLO-2D modeling software was used to assess the flooding and erosive velocities on the site. The model was constructed based on information within the San Bernardino County Hydrology Manual but is not intended for submittal to the county.

### **FLO-2D**

FLO-2D is a physical process model that routes rainfall-runoff and flood hydrographs over flow surfaces or in channels using the dynamic wave approximation to the momentum equation. FLO-2D offers advantages of 1-D models and unit hydrograph methods by allowing for breakout flows and visualization of flows across a potential site. This is particularly useful on alluvial fans and relatively flat sites, such as the Longboat site. The primary inputs are a DTM (elevation data), curve numbers, and precipitation.

Intermap was used to create the DTM using the *export to xyz file* function in Global Mapper. These XYZ files were read directly into FLO-2D.

SSURGO (county) soil data does not exist for the project area as is common in the desert areas of the American Southwest. The San Bernardino County Hydrology Manual and 2010 Addendum (<http://www.sbcounty.gov/dpw/floodcontrol/pdf/HydrologyManual.pdf>); [http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412\\_addendum.pdf](http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_addendum.pdf)) refers to the NRCS USDA Web Soil Survey for soil grouping designations and mapping. Soils in the area are primarily classified as hydrologic group A (Exhibit 3) and the landcover is primarily barren, desert brush, or irrigated fields (Exhibit 4). The desert brush classification does not provide a value for type A soils, so the type B soil CN was used in this analysis. Consequently, this conservative approach was continued in barren areas where soil type B values were used. This avoided a situation where the CN on barren areas would be less than the assumed CN on desert brush areas. The land cover information was modified based on the aerial photo to more accurately reflect the current land cover. Curve numbers (Exhibit 5) were applied to each grid cell in the FLO-2D model based on intersecting the grid with the soils and land cover information.

Precipitation data was downloaded from NOAA Atlas 14 (Appendix A) and depth at the project site was 2.83" for the 100 year storm. The upstream drainage area was small enough that there was not an appreciable difference in rainfall depths across the watershed. Atlas 14 depths were

input into the CivilD modeling software to generate the rainfall hydrograph per the San Bernardino County Hydrology Manual. This hydrograph and rainfall depth was input into FLO2D.

A grid size of 60 feet was used to model the Mojave River and flows that overtop the levee. The rest of the project outside the Mojave River was modeled using a 20 foot grid. The levee on the north side of the Mojave was modeled in FLO-2D using Intemap elevation data.

The detailed FEMA study for the Mojave River at Barstow begins near the Lenwood Road crossing, approximately 2,000' upstream from the project site. Based on this study, the peak discharge at this location was 18,968 CFS for the 100-year, 24-hour storm. This flow was input into FLO2D across the river channel. River flows in the FLO-2D model were calibrated to generally follow the profile in the FEMA Flood Insurance Study (FIS).

## **AREAS OF CONCERN**

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Overall, the analysis shows minor water depths and velocities (Exhibits 6 and 7) across the proposed site. The project location is satisfactory for a typical solar project without the need to construct major stormwater detention/diversion facilities.

Isolated depressions collect storm runoff within the project boundary. These depths vary, but are generally less than 2 feet deep and can be accounted for in the array design.

There is a levee along the north bank of the Mojave River and adjacent to the project site. In this analysis, the levee is over-topped and inundates land west of the project site. Detailed terrain features like the levee are not captured in Intemap topography in great enough detail. Table 2 compares the levee elevations from the Intemap surface to the FEMA flood elevations provided in the detailed FEMA study. This comparison shows the levee being overtopped by the FEMA flood elevations by over 2' in some locations. Accurate elevations on top of (and behind) this levee could reduce the area of inundation.

Flows which over-top the levee to the west of the project area do not appear to pose a threat to the project. The majority of this water collects in depressions on the north side of the levee and flows are insignificant within the project site.

There is a depression in the south portion of the project site and on the north side of the levee. In this analysis, this depression collects flows which over top the levee near this location. A more detailed study or filling this depression is recommended if infrastructure is to be located in that area of the project.

Table 2. Mojave River Levee (North Bank) Elevation Comparison

<b>Station</b>	<b>Levee Elevation or Top-of-Bank Per Intermap Data</b>	<b>FEMA Flood Elevation</b>	<b>Levee Elevation Compared to FEMA Flood Elevation</b>
54500	2160.3	2157.5	2.8' freeboard
55160 "U"	2164.0	2159.0	5' freeboard
55500	2165.0	2160.0	5' freeboard
56000	2164.2	2161.0	3.2' freeboard
56500	2168.5	2162.0	6.5' freeboard
57000	2169.5	2164.0	5.5' freeboard
57500	2169.0	2165.5	3.5' freeboard
58000	2167.5	2167.0	0.5' freeboard
58500	2171.0	2168.0	3' freeboard
59000	2171.4	2169.0	2.4' freeboard
59500	2174.0	2170.5	3.5' freeboard
60000	2171.7	2171.5	0.2' freeboard
60500	2172.2	2172.5	Levee elevation overtopped by 0.3'
61000	2175.7	2174.0	1.7' freeboard
61500	2172.9	2175.0	Levee elevation overtopped by 2.1'
62000	2174.5	2176.0	Levee elevation overtopped by 1.5'
62500	2177.0	2177.0	0' freeboard
63000	2177.0	2178.4	Levee elevation overtopped by 1.4'
63140 "V"	2179.8	2178.6	1.2' freeboard
633500	2179.8	2182.0	Levee elevation overtopped by 2.2'

Note: "U and V" refer to cross-sections location names provided by FEMA.

## **NEXT STEPS**

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This preliminary hydrology report provides a review of the hydrology and list of concerns relating to the Longboat Solar Project. If this project is pursued further, the following steps are recommended.

1. As the proposed array and facilities change the analysis should be revisited to ensure that all assumptions are still valid.
2. Detailed topographic data is recommended to improve the model results and better analyze the flood protection provided by the Mojave River levee.
3. Scour depth should be calculated at locations with flood depths over 0.5 feet.
4. The modeling and report should be updated for submittal to San Bernardino County for permitting.

## **Exhibits**

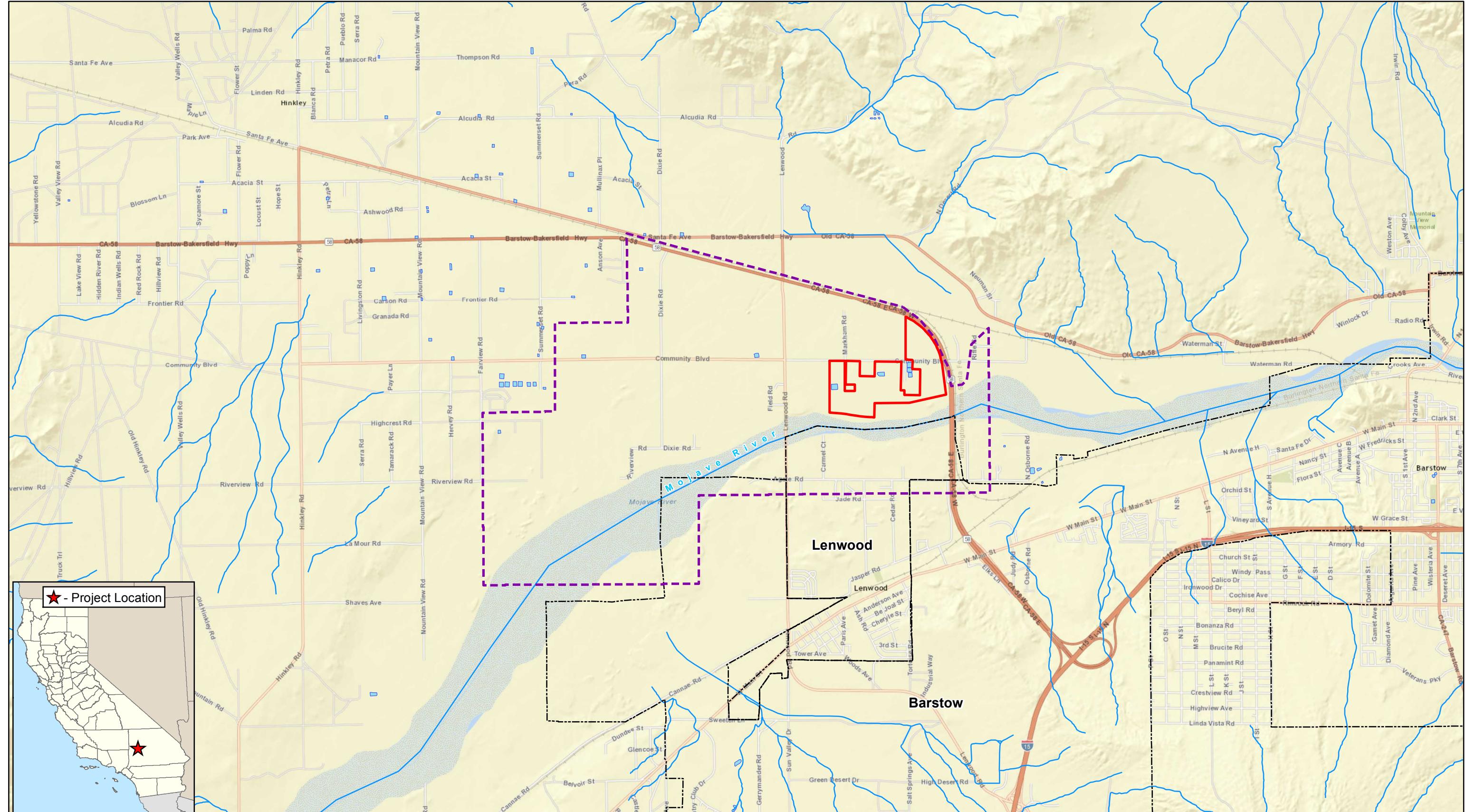
- Exhibit 1. Location Map
- Exhibit 2. Base Map
- Exhibit 3. Soils Map
- Exhibit 4. Landcover Map
- Exhibit 5. Curve Number Map
- Exhibit 6. 100-year 24-hour Max Water Depth
- Exhibit 7. 100-year 24-hour Peak Velocities

## **Appendices**

- Appendix A: Atlas 14 Printout
- Appendix B: FEMA FIRMette

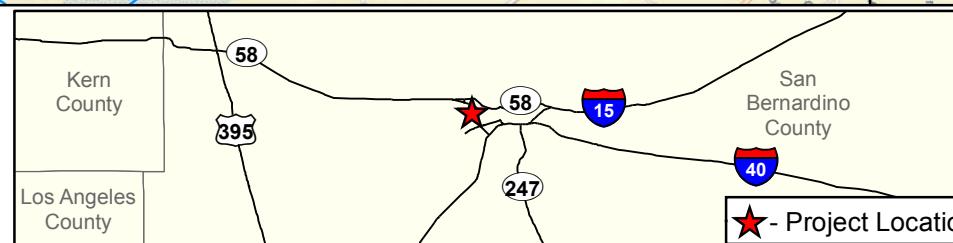
## **EXHIBITS**

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Data Source(s): Tele Atlas North America (2008); USCB (2010); BLM (2011);  
USDA/NRCS (2011); World Street Map via Esri WMS (Accessed 2014);  
Westwood Professional Services, Inc. (2014)

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[www.westwoodps.com](http://www.westwoodps.com)



### Legend

- Project Area
- Model Area
- Municipal Boundary

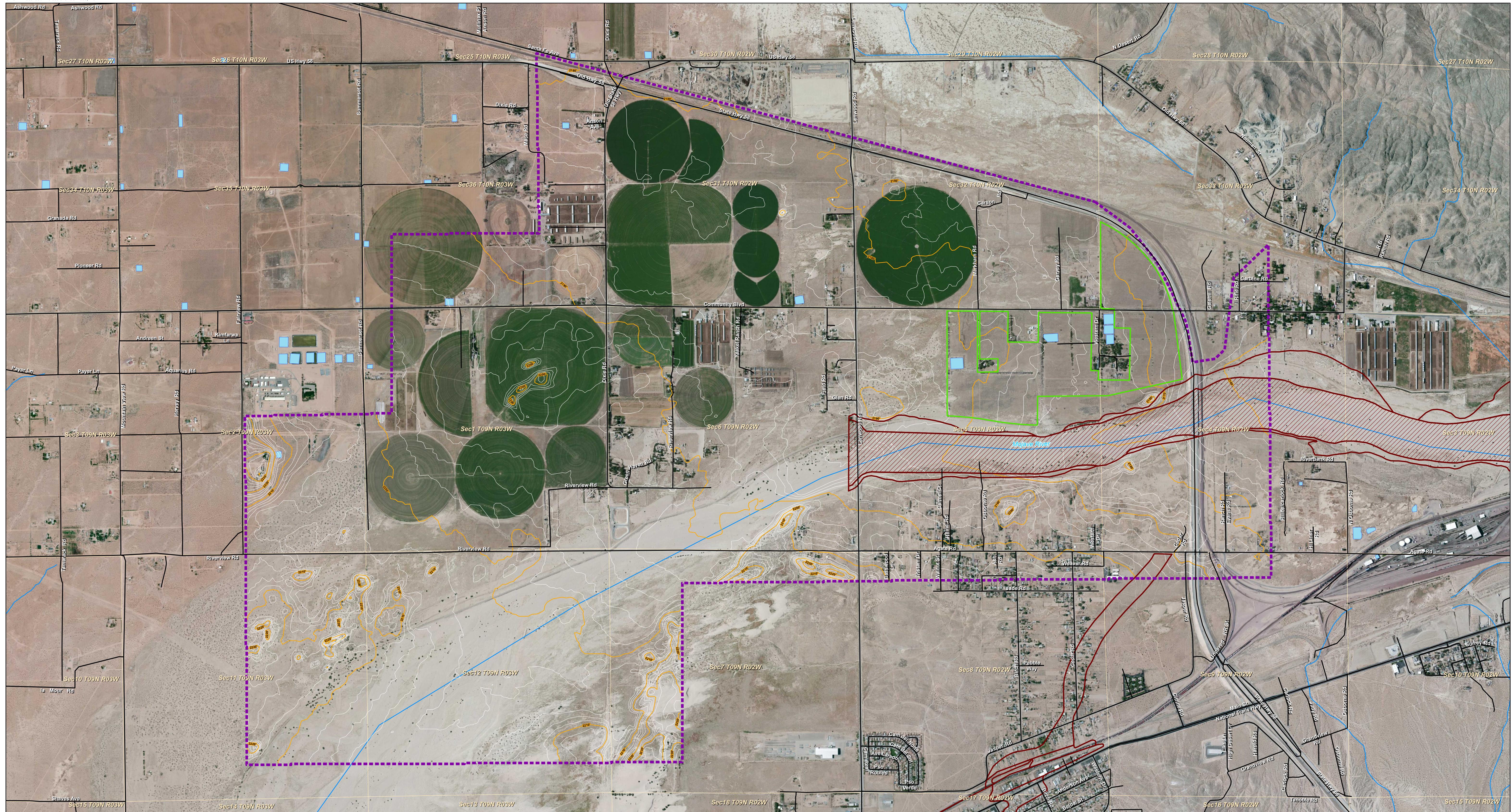
NHD Flowline  
NHD Waterbody

## Longboat Solar Project

San Bernardino County, California

Location Map

EXHIBIT 1



Data Source(s): USCB (2010); BLM (2011); USDA/NRCS (2011);  
World Imagery via Esri WMS (Accessed 2014); Westwood Professional Services, Inc. (2014)

### Legend

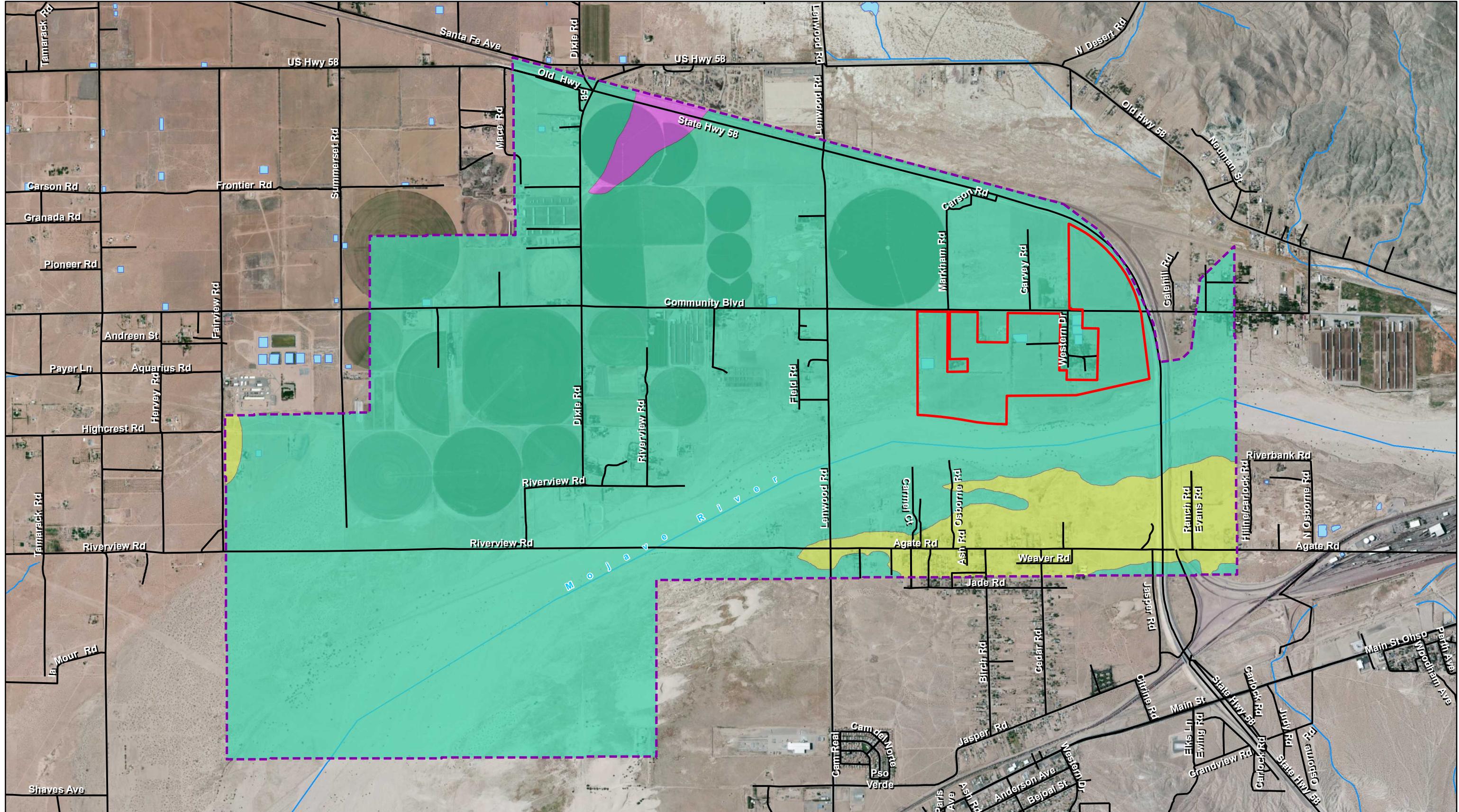
- |  |              |  |             |  |               |  |                        |
|--|--------------|--|-------------|--|---------------|--|------------------------|
|  | Model Area   |  | Road        |  | NHD Flowline  |  | FEMA 100 Yr Flood Zone |
|  | Project Area |  | 10' Contour |  | NHD Waterbody |  | FEMA Floodway          |
|  | Section      |  | 2' Contour  |  |               |  |                        |

### Longboat Solar Project

San Bernardino County, California

Base Map

EXHIBIT 7



Data Source(s): USCB (2010); BLM (2011); USDA/NRCS NHD (2011); USDA/NRCS WSS (Accessed 2014); World Imagery via Esri WMS (Accessed 2014); Westwood Professional Services, Inc. (2014).

## Legend

- The legend consists of six entries. The first three are standard symbols: a red square for 'Project Area', a wavy blue line for 'NHD Flowline', and a green shaded area for 'Soil Rating'. The next three are dashed purple rectangles: 'Model Area', 'NHD Waterbody' (represented by a blue blob), and 'Road' (represented by a black line). The final three entries are labeled 'A', 'B', and 'C' and are preceded by small green, pink, and yellow blob icons respectively.

# Longboat Solar Project

## San Bernardino County, California

## Soils Map

### **EXHIBIT 3**

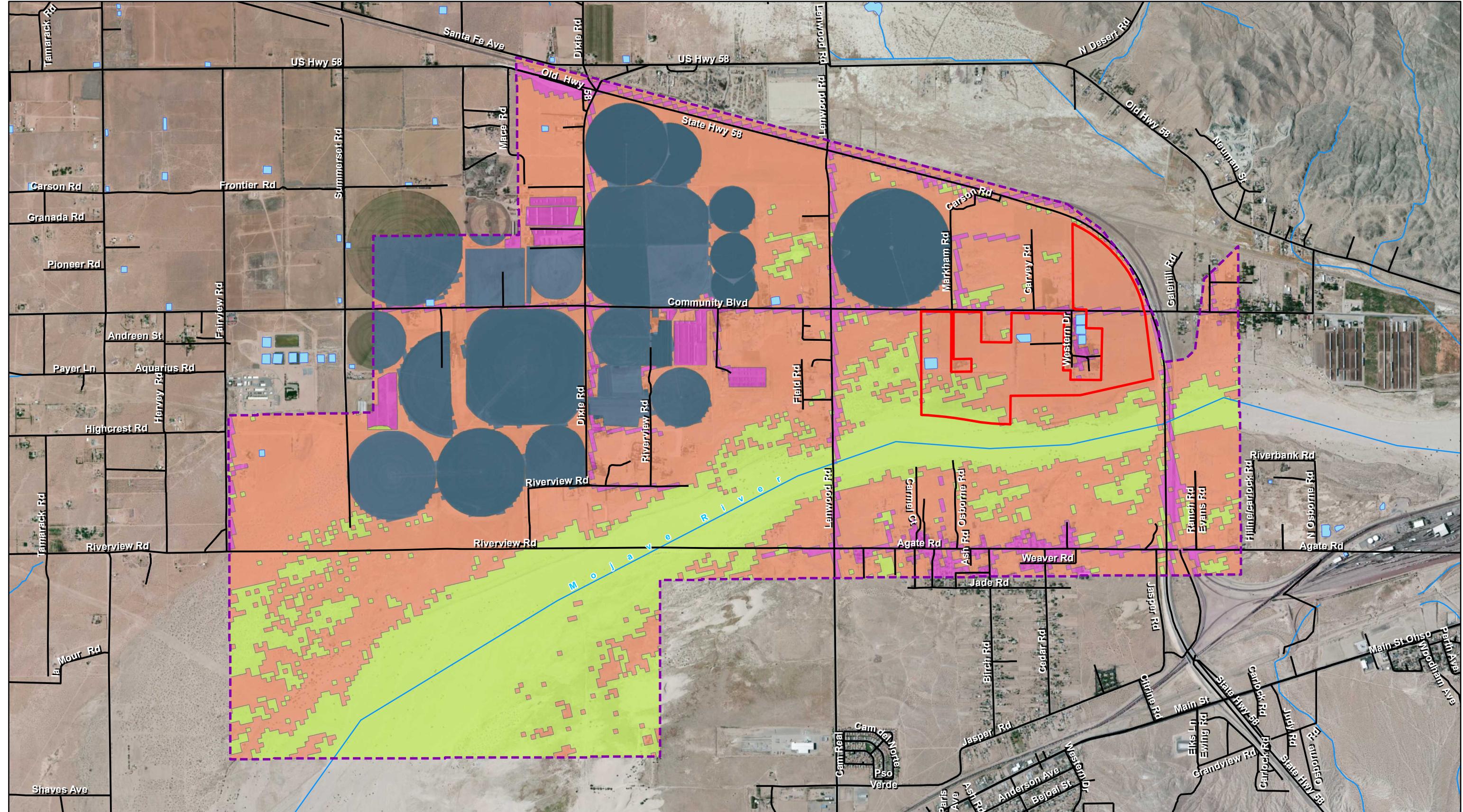


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[www.westwoodps.com](http://www.westwoodps.com)

Map Document: P:\0004258.00\GIS\LB\_Soils\_140815.mxd 8/15/2014 6:34:55 PM

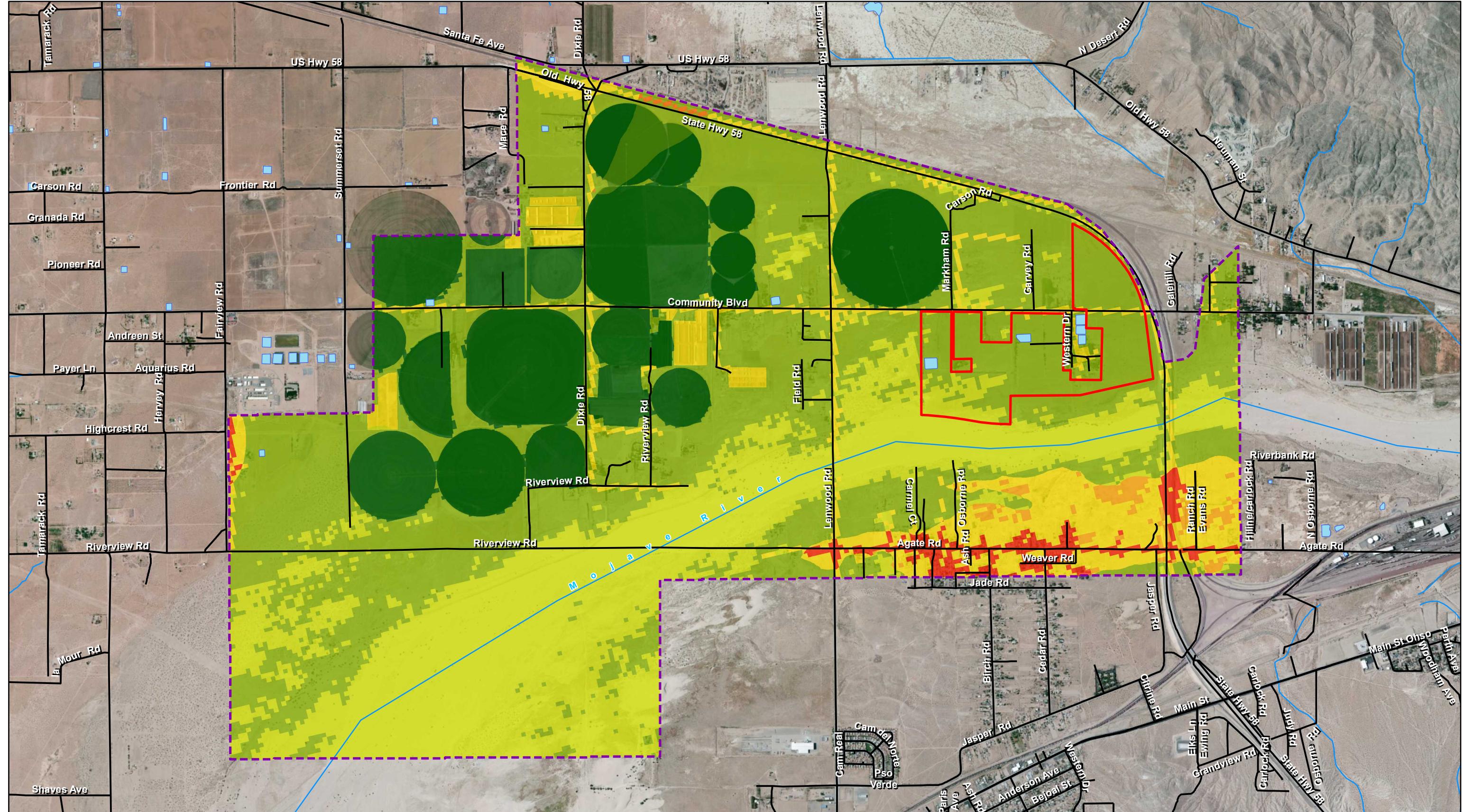
**Legend**

<span style="border: 1px solid red; padding: 2px;"> </span>	Project Area
<span style="border: 1px dashed purple; padding: 2px;"> </span>	Model Area
<span style="border: 1px solid black; padding: 2px;"> </span>	Road
<span style="color: cyan;">~</span>	NHD Flowline
<span style="color: blue;">blob</span>	NHD Waterbody
<span style="background-color: #005a99; width: 15px; height: 15px;"></span>	Alfalfa
<span style="background-color: #d9e1f2; width: 15px; height: 15px;"></span>	Barren
<span style="background-color: #ff0000; width: 15px; height: 15px;"></span>	Developed
<span style="background-color: #800000; width: 15px; height: 15px;"></span>	Shrubland

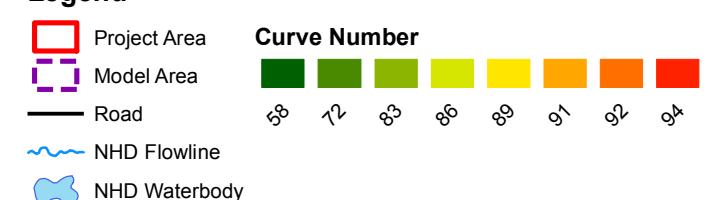
**Longboat Solar Project**

San Bernardino County, California

Landcover Map

**Legend**

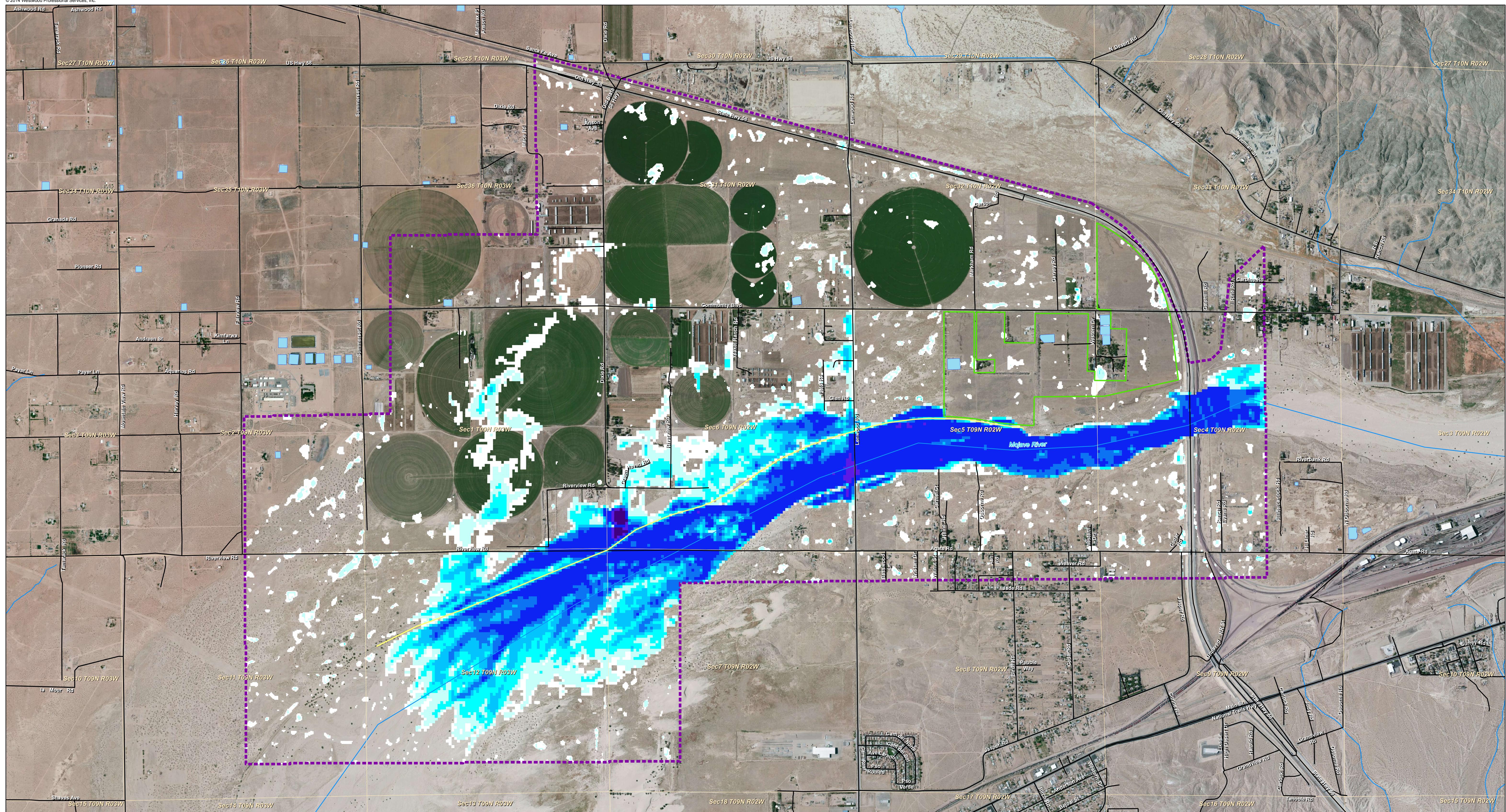
<span style="border: 1px solid red; padding: 2px;"> </span>	Project Area
<span style="border: 1px dashed purple; padding: 2px;"> </span>	Model Area
<span style="border: 1px solid black; padding: 2px;"> </span>	Road
<span style="color: cyan;">~</span>	NHD Flowline
<span style="color: blue;">blob</span>	NHD Waterbody

**Longboat Solar Project**

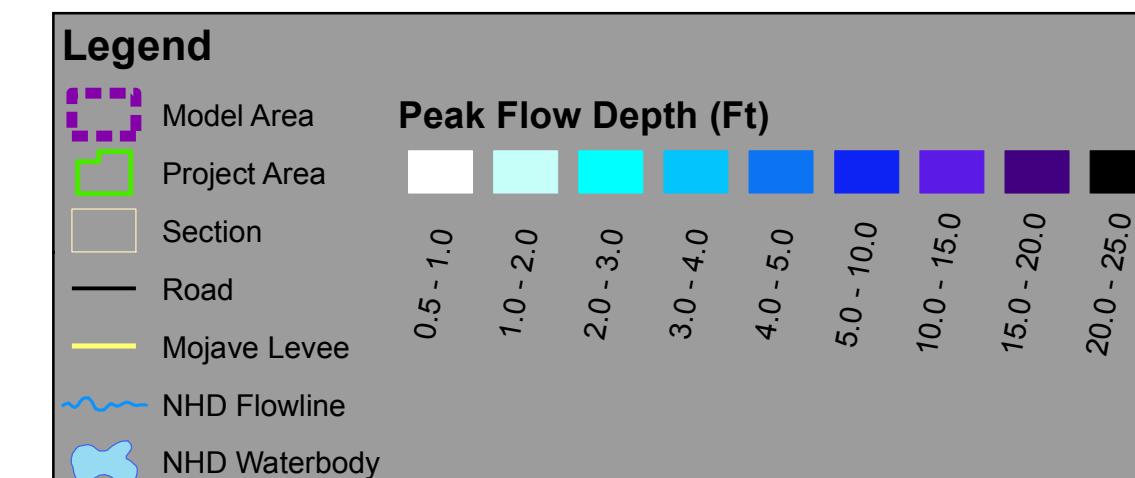
San Bernardino County, California

Curve Number Map





Data Source(s): USCB (2010); BLM (2011); USDA/NRCS (2011);  
World Imagery via Esri WMS (Accessed 2014); Westwood Professional Services, Inc. (2014)

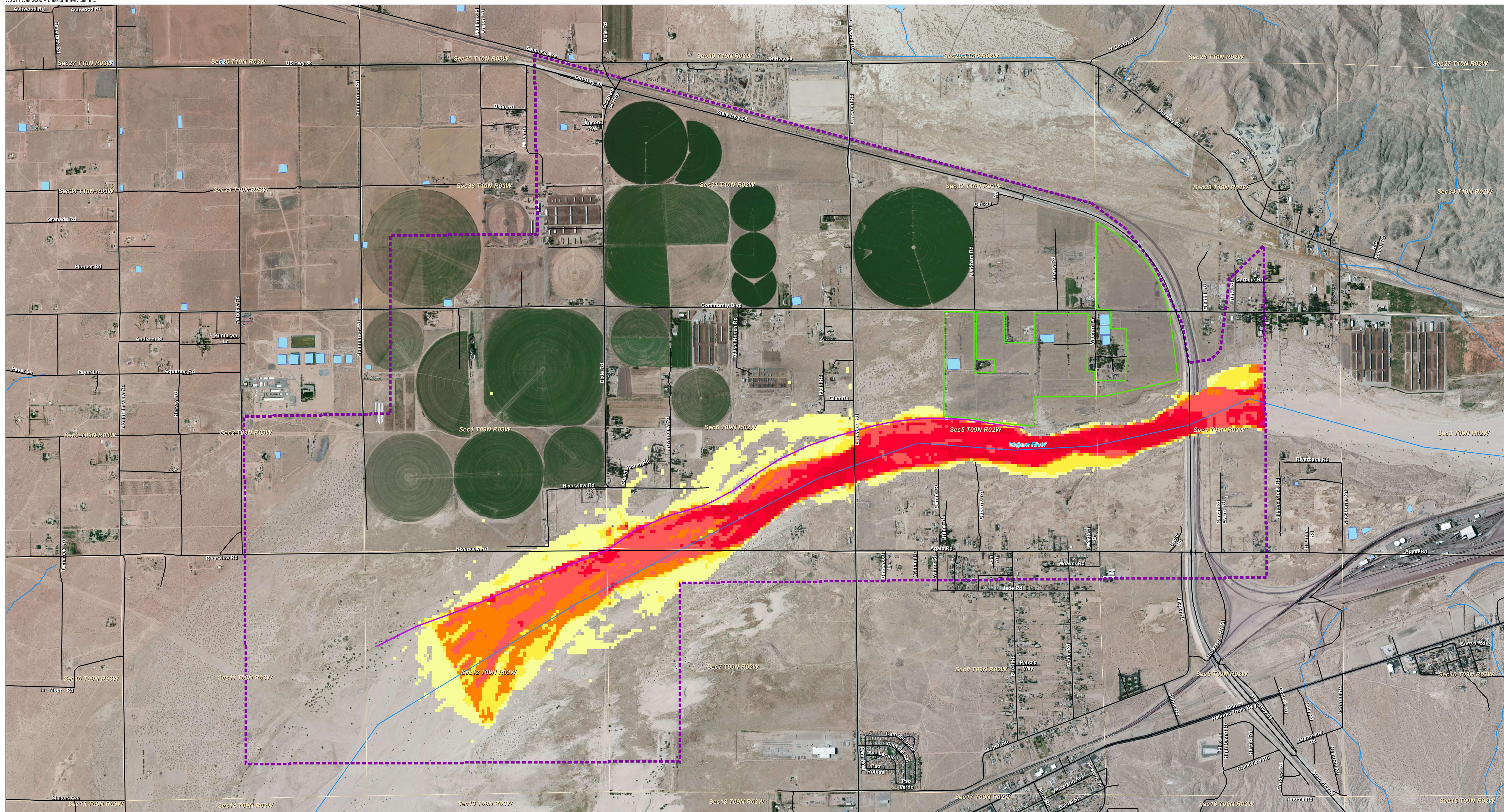


## Longboat Solar Project

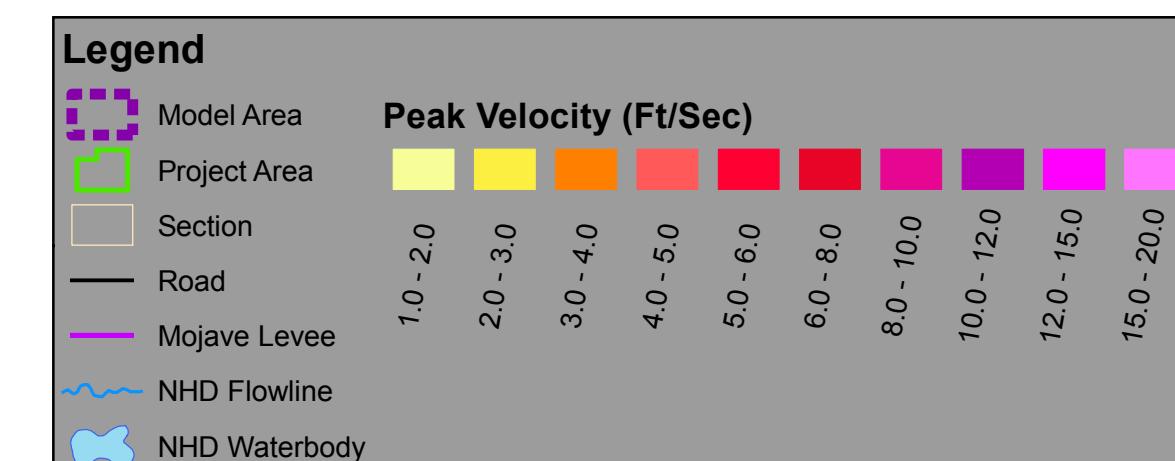
San Bernardino County, California

100-year 24-hour Max Water Depth

EXHIBIT 6



Data Source(s): USCB (2010); BLM (2011); USDA/NRCS (2011);  
World Imagery via Esri WMS (Accessed 2014); Westwood Professional Services, Inc. (2014)



## Longboat Solar Project

San Bernardino County, California

100-year 24-hour Peak Velocities

EXHIBIT 7

## **APPENDIX**

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**NOAA Atlas 14, Volume 6, Version 2**  
**Location name: Barstow, California, US\***  
**Latitude: 34.9042°, Longitude: -117.1032°**  
**Elevation: 2174 ft\***  
\* source: Google Maps



### POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

### PF tabular

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	<b>0.083</b> (0.068-0.102)	<b>0.114</b> (0.093-0.141)	<b>0.158</b> (0.129-0.195)	<b>0.195</b> (0.158-0.243)	<b>0.248</b> (0.195-0.320)	<b>0.292</b> (0.224-0.383)	<b>0.338</b> (0.254-0.454)	<b>0.388</b> (0.284-0.536)	<b>0.459</b> (0.323-0.660)	<b>0.518</b> (0.352-0.770)
10-min	<b>0.119</b> (0.097-0.146)	<b>0.164</b> (0.134-0.202)	<b>0.226</b> (0.184-0.280)	<b>0.279</b> (0.226-0.349)	<b>0.356</b> (0.279-0.458)	<b>0.418</b> (0.321-0.549)	<b>0.484</b> (0.364-0.651)	<b>0.556</b> (0.407-0.768)	<b>0.659</b> (0.463-0.946)	<b>0.743</b> (0.505-1.10)
15-min	<b>0.144</b> (0.118-0.177)	<b>0.198</b> (0.162-0.245)	<b>0.273</b> (0.223-0.338)	<b>0.338</b> (0.273-0.422)	<b>0.430</b> (0.338-0.554)	<b>0.506</b> (0.389-0.664)	<b>0.586</b> (0.440-0.788)	<b>0.672</b> (0.492-0.929)	<b>0.796</b> (0.560-1.15)	<b>0.898</b> (0.611-1.33)
30-min	<b>0.201</b> (0.164-0.248)	<b>0.277</b> (0.226-0.342)	<b>0.382</b> (0.312-0.473)	<b>0.472</b> (0.382-0.589)	<b>0.602</b> (0.472-0.775)	<b>0.707</b> (0.544-0.929)	<b>0.819</b> (0.615-1.10)	<b>0.940</b> (0.688-1.30)	<b>1.11</b> (0.783-1.60)	<b>1.26</b> (0.854-1.87)
60-min	<b>0.270</b> (0.221-0.334)	<b>0.373</b> (0.305-0.461)	<b>0.515</b> (0.420-0.637)	<b>0.636</b> (0.515-0.794)	<b>0.811</b> (0.636-1.04)	<b>0.952</b> (0.732-1.25)	<b>1.10</b> (0.829-1.48)	<b>1.27</b> (0.926-1.75)	<b>1.50</b> (1.05-2.16)	<b>1.69</b> (1.15-2.51)
2-hr	<b>0.360</b> (0.295-0.444)	<b>0.485</b> (0.396-0.599)	<b>0.655</b> (0.534-0.811)	<b>0.799</b> (0.647-0.997)	<b>1.00</b> (0.787-1.29)	<b>1.17</b> (0.897-1.53)	<b>1.34</b> (1.01-1.80)	<b>1.52</b> (1.11-2.11)	<b>1.78</b> (1.25-2.56)	<b>1.99</b> (1.36-2.96)
3-hr	<b>0.419</b> (0.343-0.517)	<b>0.561</b> (0.459-0.693)	<b>0.754</b> (0.615-0.934)	<b>0.916</b> (0.741-1.14)	<b>1.14</b> (0.897-1.47)	<b>1.33</b> (1.02-1.74)	<b>1.52</b> (1.14-2.04)	<b>1.72</b> (1.26-2.37)	<b>2.00</b> (1.41-2.88)	<b>2.23</b> (1.52-3.31)
6-hr	<b>0.521</b> (0.426-0.642)	<b>0.696</b> (0.569-0.860)	<b>0.932</b> (0.760-1.15)	<b>1.13</b> (0.914-1.41)	<b>1.40</b> (1.10-1.81)	<b>1.62</b> (1.25-2.13)	<b>1.85</b> (1.39-2.48)	<b>2.08</b> (1.52-2.88)	<b>2.41</b> (1.70-3.47)	<b>2.68</b> (1.82-3.98)
12-hr	<b>0.607</b> (0.497-0.749)	<b>0.819</b> (0.670-1.01)	<b>1.10</b> (0.901-1.37)	<b>1.34</b> (1.09-1.67)	<b>1.67</b> (1.31-2.15)	<b>1.93</b> (1.48-2.54)	<b>2.20</b> (1.65-2.96)	<b>2.48</b> (1.82-3.43)	<b>2.87</b> (2.02-4.13)	<b>3.18</b> (2.17-4.73)
24-hr	<b>0.763</b> (0.677-0.878)	<b>1.04</b> (0.925-1.20)	<b>1.42</b> (1.25-1.64)	<b>1.73</b> (1.51-2.01)	<b>2.15</b> (1.83-2.59)	<b>2.49</b> (2.06-3.05)	<b>2.83</b> (2.29-3.56)	<b>3.18</b> (2.51-4.12)	<b>3.68</b> (2.78-4.96)	<b>4.06</b> (2.97-5.68)
2-day	<b>0.884</b> (0.784-1.02)	<b>1.22</b> (1.08-1.40)	<b>1.66</b> (1.47-1.91)	<b>2.02</b> (1.77-2.35)	<b>2.50</b> (2.12-3.01)	<b>2.88</b> (2.39-3.53)	<b>3.25</b> (2.64-4.10)	<b>3.64</b> (2.87-4.72)	<b>4.17</b> (3.15-5.63)	<b>4.58</b> (3.35-6.40)
3-day	<b>0.959</b> (0.851-1.10)	<b>1.33</b> (1.18-1.53)	<b>1.80</b> (1.60-2.08)	<b>2.19</b> (1.92-2.55)	<b>2.71</b> (2.30-3.26)	<b>3.10</b> (2.58-3.81)	<b>3.50</b> (2.84-4.41)	<b>3.91</b> (3.08-5.06)	<b>4.45</b> (3.37-6.01)	<b>4.87</b> (3.56-6.81)
4-day	<b>1.00</b> (0.891-1.15)	<b>1.39</b> (1.23-1.60)	<b>1.89</b> (1.67-2.18)	<b>2.28</b> (2.00-2.66)	<b>2.82</b> (2.39-3.39)	<b>3.22</b> (2.67-3.96)	<b>3.62</b> (2.94-4.56)	<b>4.03</b> (3.18-5.22)	<b>4.58</b> (3.46-6.18)	<b>5.00</b> (3.65-6.98)
7-day	<b>1.09</b> (0.969-1.26)	<b>1.50</b> (1.33-1.73)	<b>2.02</b> (1.79-2.33)	<b>2.44</b> (2.14-2.83)	<b>2.98</b> (2.53-3.59)	<b>3.39</b> (2.81-4.16)	<b>3.79</b> (3.07-4.78)	<b>4.20</b> (3.31-5.44)	<b>4.74</b> (3.58-6.39)	<b>5.14</b> (3.75-7.19)
10-day	<b>1.16</b> (1.03-1.33)	<b>1.59</b> (1.41-1.83)	<b>2.13</b> (1.89-2.46)	<b>2.56</b> (2.25-2.98)	<b>3.12</b> (2.65-3.76)	<b>3.54</b> (2.94-4.35)	<b>3.95</b> (3.20-4.97)	<b>4.36</b> (3.43-5.65)	<b>4.90</b> (3.70-6.61)	<b>5.30</b> (3.87-7.41)
20-day	<b>1.34</b> (1.19-1.54)	<b>1.86</b> (1.65-2.14)	<b>2.51</b> (2.22-2.89)	<b>3.01</b> (2.64-3.51)	<b>3.68</b> (3.12-4.42)	<b>4.16</b> (3.46-5.12)	<b>4.64</b> (3.76-5.85)	<b>5.12</b> (4.03-6.63)	<b>5.74</b> (4.33-7.74)	<b>6.20</b> (4.52-8.66)
30-day	<b>1.50</b> (1.34-1.73)	<b>2.11</b> (1.87-2.43)	<b>2.87</b> (2.54-3.31)	<b>3.47</b> (3.04-4.03)	<b>4.25</b> (3.60-5.11)	<b>4.82</b> (4.01-5.93)	<b>5.39</b> (4.37-6.79)	<b>5.96</b> (4.69-7.71)	<b>6.69</b> (5.06-9.03)	<b>7.24</b> (5.28-10.1)
45-day	<b>1.71</b> (1.52-1.96)	<b>2.43</b> (2.15-2.79)	<b>3.34</b> (2.95-3.85)	<b>4.06</b> (3.56-4.72)	<b>5.00</b> (4.24-6.02)	<b>5.71</b> (4.74-7.01)	<b>6.40</b> (5.19-8.06)	<b>7.09</b> (5.59-9.19)	<b>8.00</b> (6.05-10.8)	<b>8.68</b> (6.34-12.1)
60-day	<b>1.87</b> (1.66-2.15)	<b>2.69</b> (2.38-3.10)	<b>3.73</b> (3.30-4.31)	<b>4.56</b> (3.99-5.30)	<b>5.65</b> (4.79-6.79)	<b>6.46</b> (5.36-7.94)	<b>7.27</b> (5.89-9.15)	<b>8.08</b> (6.37-10.5)	<b>9.15</b> (6.91-12.4)	<b>9.96</b> (7.27-13.9)

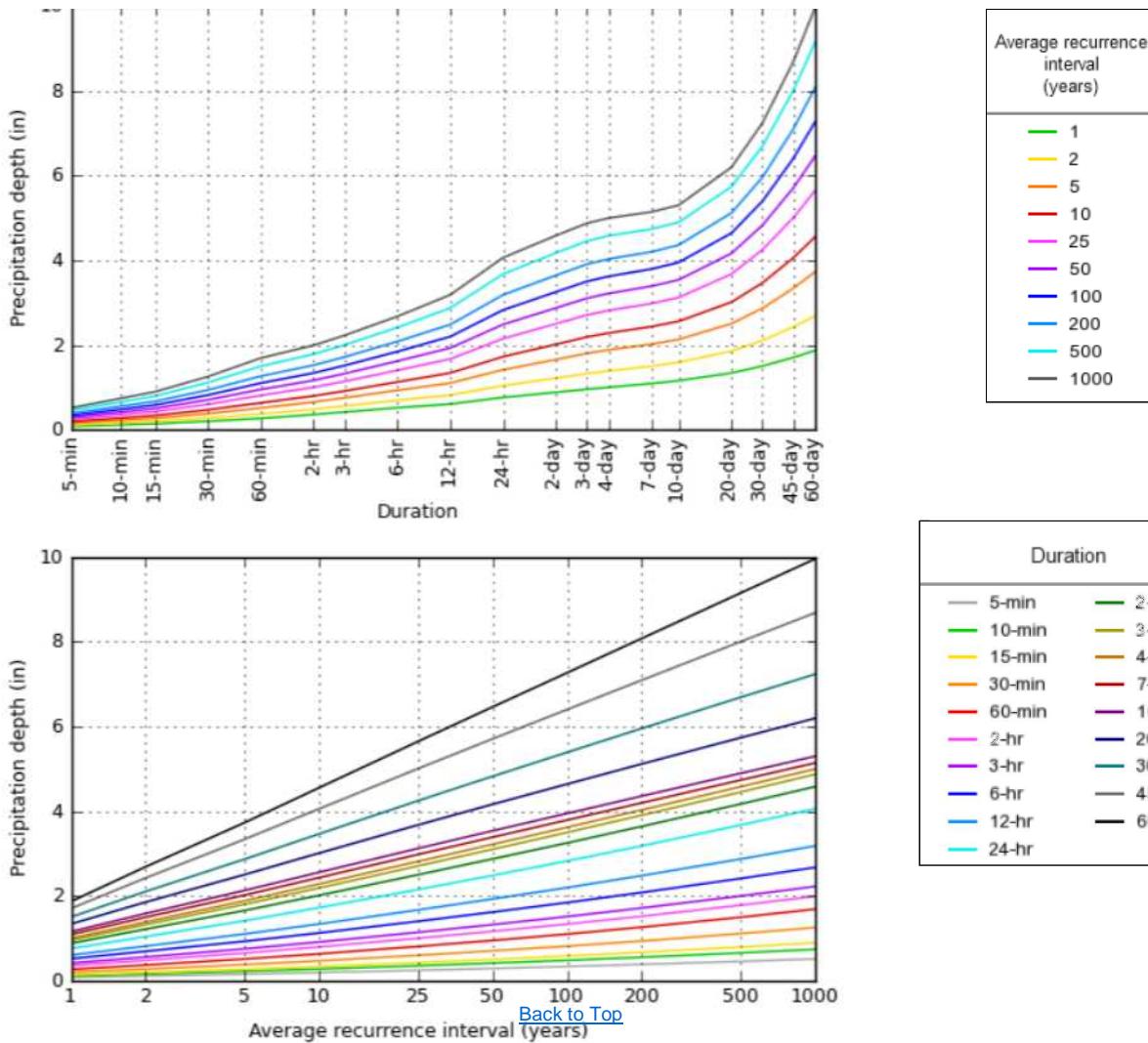
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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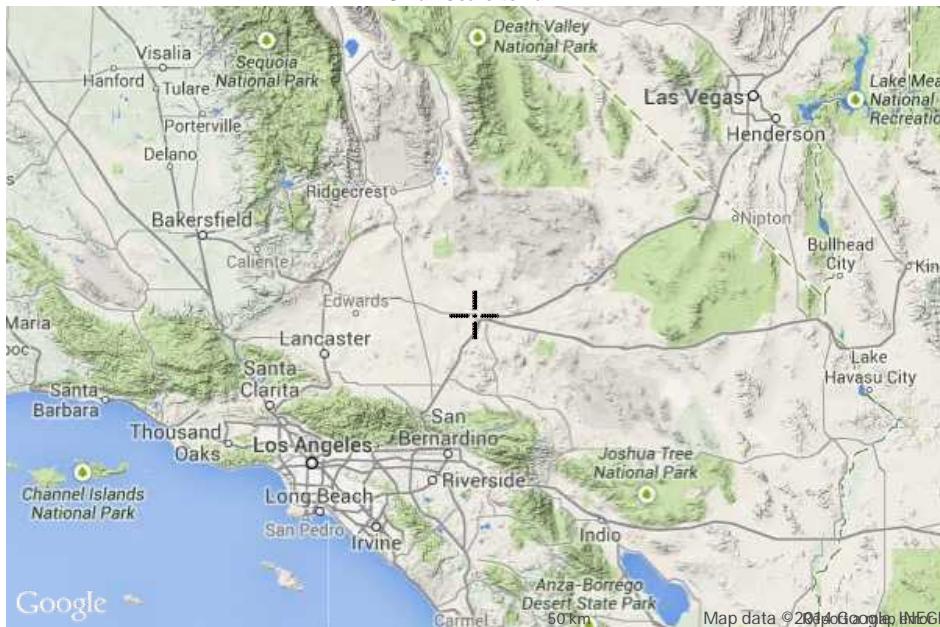
### PF graphical



### Maps & aerials

Created (GMT): Tue Aug 5 12:19:26 2014

#### Small scale terrain





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Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

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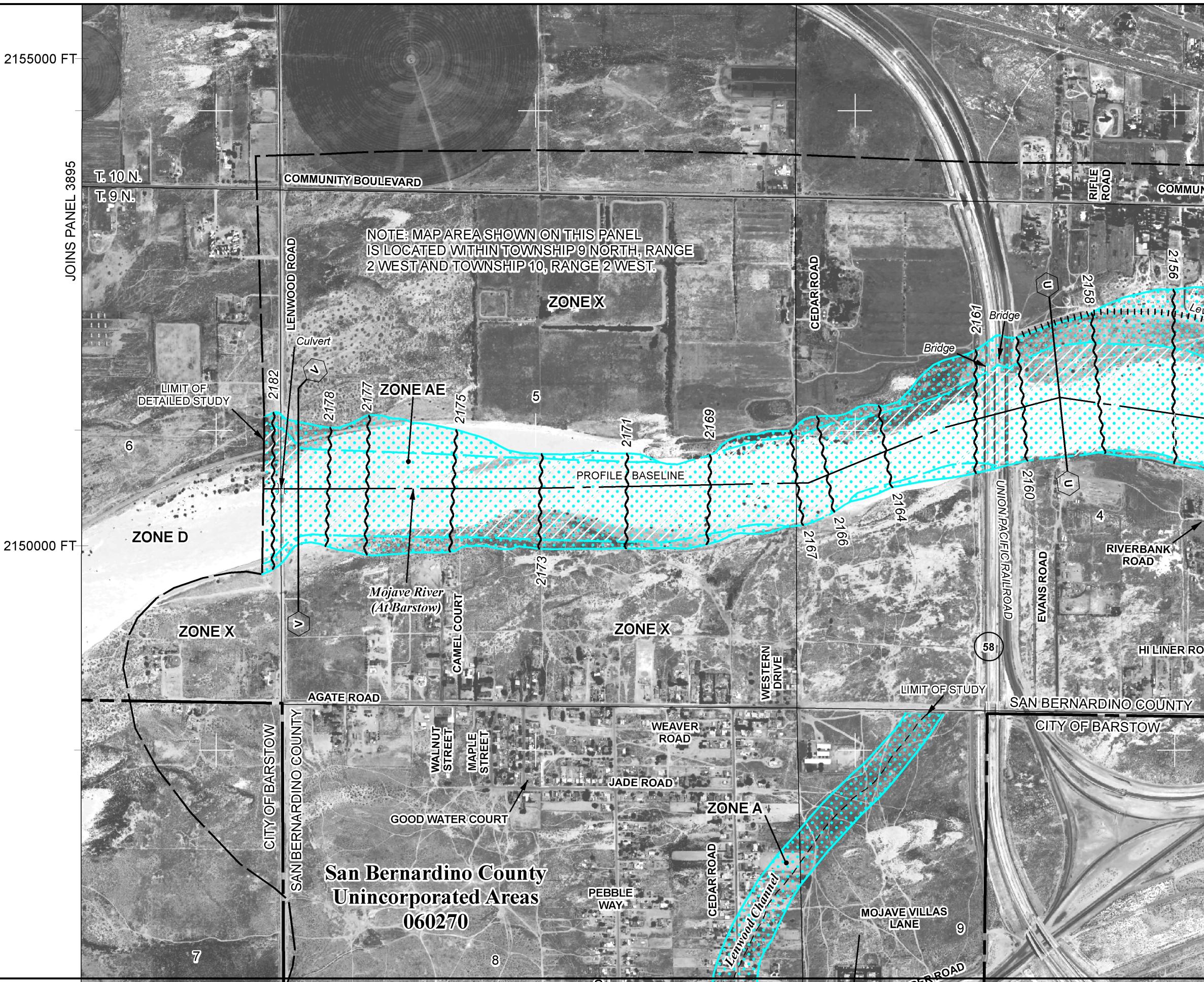
national Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 1000'

0 1000 2000  
FEET  
METERS

JOINS PANEL 3895



NFIP  
PANEL 3915H

**FIRM**  
FLOOD INSURANCE RATE MAP

SAN BERNARDINO  
COUNTY,  
CALIFORNIA  
AND INCORPORATED AREAS  
PANEL 3915 OF 9400  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:  
COMMUNITY NUMBER PANEL SUFFIX  
BARSTOW, CITY OF SAN BERNARDINO COUNTY 060271 3915 H  
060270 3915 H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

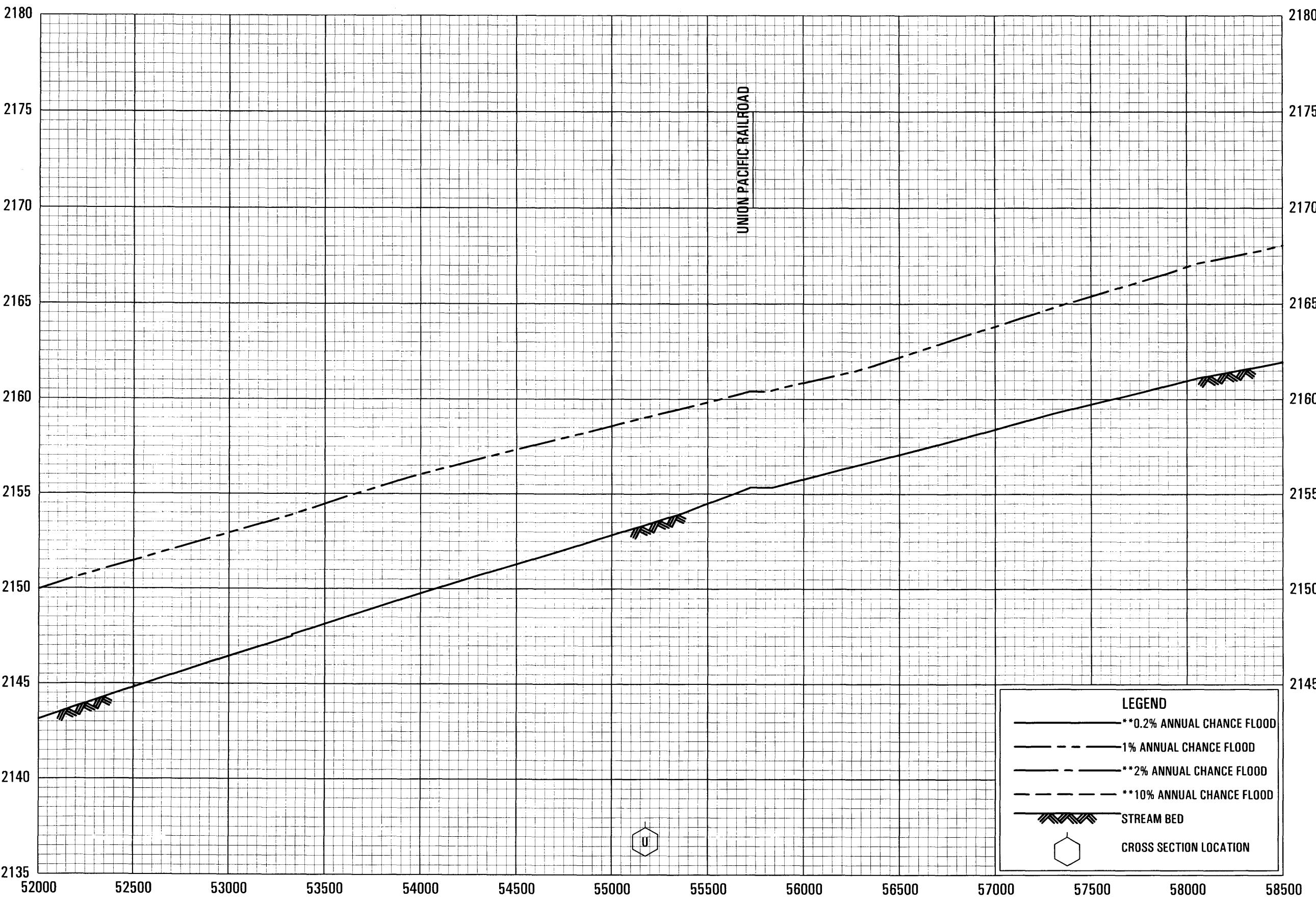
MAP NUMBER  
06071C3915H

MAP REVISED  
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msfc.fema.gov](http://www.msfc.fema.gov)

ELEVATION IN FEET (NAVD 88)



\*LIMIT OF DETAILED STUDY IS LOCATED 195 FEET  
DOWNSTREAM OF LENWOOD ROAD

STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAILED STUDY\*

\*\*DATA NOT AVAILABLE

108P

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SAN BERNARDINO COUNTY, CA  
AND INCORPORATED AREAS

FLOOD PROFILES

MOJAVE RIVER (AT BARSTOW)

2180

2175

2170

2165

2160

2155

2150

2145

2140

2135

